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THE NORTH AMERICAN SPECIES OF *CRYPTOLUCILIA* BRAUER AND BERGENSTAMM (*PSEUDOPYRELLIA* GIRSCHNER) (*DIPTERA, ANTHOMYIDÆ*).

By J. Bequaert.

Some time ago I sent to the eminent French dipterist, Dr. J. Villeneuve, a series of specimens of the common blue-green anthomyid fly which is passing in this country under the name "*Pseudopyrellia cornicina.*" Dr. Villeneuve called my attention to the fact that these specimens were not true *cornicina* but belonged to a related species, *cæsarion* (Meigen). On taking the matter up with Dr. J. M. Aldrich and Mr. C. W. Johnson, and on examining a number of public and private collections, it becomes apparent that these two species are generally confused here. Aldrich (Cat. North American Dipt., 1905, p. 524), for instance, treats *cornicina* and *cæsarion* as synonyms. It seems useful therefore to point out the main differences between them, so as to facilitate their identification by local entomologists.

As indicated by Stein (Arch. f. Naturg., 83, Abt. A, Heft 1, 1919, p. 105), the name *Cryptolucilia* Brauer and Bergenstamm (Denkschr. Ak. Wiss. Wien, 60, 1893, pp. 179 and 206; type: *C. asiatica* Brauer and Bergenstamm = *Musca cæsarion* Meigen according to Stein) has priority over *Pseudopyrellia* Girschner (Berlin. Entom. Zeitschr., 38, (1893) 1894, p. 306), since Girschner's paper was not issued until January 1894.

The species of *Cryptolucilia* have long been placed among *Lucilia*, which they resemble in color and general appearance. They are, however, easily separated from the latter genus by the absence of hypopleural bristles and the arrangement 1:2 of the sternopleural bristles. *Cryptolucilia* therefore belongs to the Anthomydiæ as defined by Girschner.

Of the Nearctic anthomyid genera, *Pyrellia* and *Morellia* alone have a similar metallic blue-green color. *Cryptolucilia* can

be distinguished from these by the contour of the fourth longitudinal vein, which in its apical part is bluntly angular and a little sinuate beyond the bend, whereas in *Pyrellia* and *Morellia* the curve of the distal section of the fourth vein is broad and gentle.

1. **Cryptolucilia caesarion** (Meigen) (=*Musca cæsarion* Meigen, Syst. Beschreib. Europ. zweifl. Ins., 5, 1826, p. 57). Thorax with a pair of acrosticals before the transverse suture, usually placed rather irregularly in an oblique line; three posterior dorsocentrals. Front of the male about one-sixth the width of the head; in the female comparatively wide, measuring over one-third of the total width of the head.

This is a common and widely distributed North American species and, as stated above, is labeled "*Pseudopyrellia cornicina*" in American collections. The figures given by Hough (Biol. Bull., 1, 1899, p. 27, fig. 9) for *cornicina* undoubtedly refer to this species. I have seen specimens from the following States: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Nebraska, Texas, South Dakota, Arizona, California, and Washington; also from Canada (Ontario, Quebec.) In addition, Dr. Aldrich possesses specimens from Kansas, Idaho, Nevada, and New Mexico.

The brilliant blue larva lives in cow manure and the adult flies are commonly found on fresh cow dung. This is evidently the species which was reported by Howard (Proc. Washington Ac. Sci., 2, 1900, p. 579), Brues (Psyche, 9, 1902, p. 354), and F. C. Pratt (Canad. Entom., 44, 1912, p. 181) under the name "*Pseudopyrellia cornicina*" as having been bred in abundance from cow manure. Howard figures the early stages.

Among the very large number of *Cryptoluciliæ* from North America examined, I have found only one in which the anterior acrosticals were lacking, but as this specimen possessed *three* posterior dorsocentrals, I believe it is an abnormal example of *C. cæsarion.*

2. **Cryptolucilia cornicina** (Fabricius) (=*Musca cornicina* Fabricius, Spec. Insect., 2, 1871, p. 438). Thorax without acrosticals before the transverse suture; four posterior dorsocentrals. Front comparatively narrower in both sexes.

This species is thus far unknown from North America. In Europe, however, it is not less common than the foregoing. I have examined a male from Rambouillet, France, kindly sent to me by Dr. Villeneuve.

Stein (Arch. f. Naturg., 83, Abt. A, Heft 1, 1919, p. 105) synonymizes *Pyrellia frontalis* Thomson (Eugenies Resa, 2, Zool., 1, Diptera, 1868, p. 545), from California, with *C. cornicina*. Whether this is based on an examination of Thomson's type specimen is not known, but the description applies equally well to *C. cæsarion*.

The failure of North American entomologists to separate *cæsarion* and *cornicina* is evidently due to the confusion on this subject which has been allowed to prevail until recent years by European dipterists. Even Girschner while establishing his genus *Pseudopyrellia* on "*P. cornicia* F11." was evidently using specimens of *cæsarion*, since he expressly mentions among the generic characters the presence of a pair of heavy acrosticals. Schnabl and Dziedzicki (Die Anthomyiden. Nov. Acta Ac. Leop. Car. Nat. Cur., 95, 1911, pp. 224 and 229) repeated the same error. The two species, however, have been correctly separated by Stein (Arch. f. Naturg., 81, Abt. A, Heft 10, 1916, p. 18), who has also examined their type specimens.

Considering the constant association of *Cryptolucilia cæsarion* with cattle dung, the question might be raised whether this fly has not been imported from the Old World through the agency of man, at a comparatively recent date. It is, moreover, remarkable that of the two common Palearctic species, only one has thus far established itself in North America.

NOTES ON THE PUFFBALL BEETLE, *CÆNOCARA OCULATA* (SAY)

By Harry B. Weiss, New Brunswick, N. J.

This member of the family *Anobiidæ* was described by Say in 1824 (App. vol. II, Keating's Exp. to source of St. Peters Riv. under Maj. Long, Phila., 1824, p. 273) and has long been known to collectors as being associated with the fungi commonly called puffballs. Blatchley (Col. Ind., 1910, p. 884) records it from Indiana as occurring throughout the state on low vegetation in damp localities and also in small puffballs (Lycoperdon). Smith (Ins. N. J., p. 307) records it as common throughout the state but does not mention any host.

For the past two years it has been noted at Monmouth Junction, N. J., breeding in a species of puffball known as *Scleroderma vulgare* and undoubtedly occurs in many localities where its host grows. Leng (Check List Col. Amer. N. of Mex. p. 244) indicates its wide distribution by the following localities—Ct., Fla., New Eng., Ariz., Ind.

Fungi belonging to the genus *Lycoperdon* are small puffballs with somewhat thickened bases or stalks. When young the interior is soft, white and firm; later it becomes yellowish and finally forms a purplish brown, dusty mass consisting of spores and threadlike filaments. Species of this genus appear in the summer and autumn and are common on the ground or on old stumps, usually in clusters. In the genus *Scleroderma*, the plants are sessile or nearly so. The peridium is thick and leathery and sometimes becomes cracked and ruptured at the apex. *Scleroderma vulgare* in which *Cœnocara oculata* was found breeding is about 5 cm., in diameter, subglobular, with a thick, yellowish or pale brown scaly or warty, leathery peridium. The spore mass is purplish black. This species is quite common and occurs in dry places and on hard ground. At Monmouth Junction, N. J., the fructifications were found in the dry parts of a large wooded area.

On September 5, several adults of *Cœnocara oculata* were noted with their bodies projecting slightly from small circular holes in the walls of the fungi. Upon cutting such fungi open, they were found to contain, in addition to the blackish, powdery mass of spores, numerous full grown larvæ some of which had constructed pupal chambers or cells. One puffball contained fully 100 larvæ. Many of the larvæ pupated by September 9 and on September 22 fully colored adults were found in the cells.

When full grown each larva constructs an oval cell in the spore mass. These are about 4 mm., long and 2 mm., wide and many are attached to the inner side of the peridial wall. Pupation takes place in these cells and when the adult is ready to emerge it simply eats through the wall of the fungus. Upon examining these exit holes it will be found that they are shallow and extend in only to the depth of the pupal cell. The larvæ undoubtedly do most if not all of their feeding in the fungus when it is young as at this time, the interior is solid and fleshy. When ripe, the spore mass is dry and powdery.

Larvæ. Length about 4 mm. Width about 1.5 mm. Form subcylindrical, tapering toward head, posterior end rounded, somewhat white grub-like in appearance. Body curved, almost semicircular in outline. White except for brownish mouth parts. Head small, subcircular, bearing minute hairs; collum absent; antennæ single jointed, minute, almost obsolete; ocelli absent; cranial sutures indistinct; gula membraneous; ventral mouth parts fleshy. Clypeus and labrum distinct, former transverse, latter small, semicircular bearing several minute hairs on anterior edge. Mandibles comparatively large, heavy, broad across base, narrowing toward tip which is strongly bifid. Lacinia and galea distinct, well separated, each bearing chitinous hairs; maxillary palpi two-jointed, second joint tapering and twice as long as the first; labium with mentum and submentum indistinct; labial palpi two-jointed. Body segmentation indistinct; body bearing numerous minute hairs and irregular transverse rows of larger hairs on raised dorsal folds of thoracic and ab-

dominal segments. Anal end of body and anal area bearing numerous longer hairs. True legs absent, indicated by ambulatory tubercles.

Pupa. Length about 3 mm. Width about 1.8 mm. White; oval; posterior end of abdomen terminated by a pair of tubercles each bearing a short, weak spine; remainder of body surface devoid of spines or hairs.

Adult. Reference to the place of original description has already been made and Blatchley's description (Col. Ind. p. 884) is available if the original is not. The adult is interesting on account of its ability to pack itself up into a little globe or ball. The legs shut together; a cavity on the breast receives the antennæ and large mouth parts and the head is folded down over the chest closing this cavity. In such a closely packed condition, the insect resembles a small seed. When disturbed, it immediately folds up.

RECORDS OF HYMENOPTEROUS PARASITES IN PENNSYLVANIA

By A. B. Champlain.

Bureau of Plant Industry, Harrisburg, Pa.

Definite breeding records of Hymenopterous parasites are a'ways valuable contributions to our knowledge of this order of insects. The following collection of fragmentary records of parasitic Hymenoptera and their hosts are from rearings by the author, and from notes in the file of the Bureau of Plant Industry, extending over a period of years. Due credit for the records obtained appears throughout the paper.

The recorded species which are in the collection of the Pennsylvania Bureau of Plant Industry were all identified or verified by leading authorities on Hymenoptera,—S. A. Rohwer and R. A. Cushman of the U. S. National Museum, and some by H. L. Viereck of the U. S. Bureau of Biological Survey. The abbreviations—Det. Roh., Det. Cush., Det. Vier.—designate the species identified by each.

Evaniidæ

Hemistephanus sp. (Det. Cush.). Hummelstown, Pa., Rockville, Pa., Magnolia, Md., is a parasite of *Dicerca divaricata* in *Betula lenta* and of unknown borers in *Quercus bicolor* and *Quercus* sp. Notes by H. B. Kirk and J. N. Knull.

Oleisoprister abbotii Westw., Hummelstown, Pa., reared from *Liriodendron tulipifera* infested by *Leptura mutabilis.*

Odontaulacus bilobatus (Prov.), (Det. Roh.) Mt. Holly, Pa., June 14, 1921—Knull and Champlain. Adults were flying around and alighting on dying hemlock *Tsuga canadensis.* Upon cutting into the bark a heavy infestation of *Melanophila fulvoguttata* was found in adult and pupal stages. In some cells adults and pupæ (one to a cell) of *O. bilobatus* were found with remnants of the host.

Odontaulacus rugitarsis Cress. (Det. Cush.) New Bloomfield, Pa., June 16. Adults were plentiful flying around and alighting on cut white pine (*Pinus strobus*) infested by Scolytoids and Cerambycids.

Pammegischia burquei Prov. (Det. Cush.), Harrisburg, Pa. A parasite of *Xiphidria champlaini* Roh. in dead branches of *Carpinus caroliniana*; *X. attenuata* Nort. in dead branches of *Tilia americana* and of *X. maculata* in dead *Acer rubrum*. Adults fly during May.

Braconidæ

Macrocentrus delicatus Cress. (Det. Vier.). Willow Street, Pa. Reared from pupæ of *Mineola indiginella*.

Helconidea ligator Say (Det. Cush.), Hummelstown, Pa., Jan. 23. Reared from oak (*Quercus bicolor*) infested by *Purpuricenus axilaris*. J. N. Knull; West Chester, Pa. Reared from dead *Morus* sp. infested by borers, Camp Hill, Pa., from dead *Robinia pseudacacia*, infested by *Neoclytus erythrocephalus*, F. M. Trimble.

Helconidea borealis Cress. (Det. Roh.), Harrisburg, Pa. Parasite on Cerambycid larva in dead *Rhus toxicodendron*, H. B. Kirk, Hummelstown, Pa. Parasite of Cerambycid larvæ in dead mulberry (*Morus rubra*) branches,—J. N. Knull.

Helcon pedalis Cress. (Det. Roh.), Hummelstown, Pa. Parasite on *Xylotrechus* larvæ in dead hemlock (*Tsuga canadensis*), —J. N. Knull.

Ichneumonidæ

Nemeritis canescens (Grav.) (Det. Cush.), Butler, Pa., IX. 25. In flour mills. A parasite of Mediterranean flour moth.

Orthopelma luteolata (Grav.) (Det. Cush.), Chester, Pa. VI-27. Reared from Cynip galls on wild rose.

Cremastus gracilipes Cush. (Det. Cush.), Rockville, Pa. Reared from cat tail rush infested by *Dicymolomia julianalis*; Collins, Pa. Lepidopterous larvæ infesting "cat-tails" growing along canal, caged IX-22, indoors—Nov. 23 to next April, many moths and ichneumonid parasites emerged—A. F. Satterthwait." Identified same as above.

Labena apicalis Cress. (Det. Cush.), Rockville, Pa. Parasite of *Stenosphenus notatus* in Hicoria sp., I-II,—J. N. Knull.

Xorides calidus (Prov.) (Det. Roh.), Harrisburg, Pa. Parasite of *Phloeotrya* 4—*maculata* in dead sumac (*Rhus typhina*).

Odontomerus canadensis Prov. (Det. Cush.), Hummelstown, Pa., V-18. Parasite of Cerambycid in sumac (*Rhus* sp.), Knull.

Glypta simplicipes Cress. (Det. Cush.), Philadelphia, Pa., V-20. Reared from larva of leaf tyer on *Azalea* sp.,—J. K. Primm.

Scambus (*Epiurus*) *tecumseh* Vier. (Det. Cush.). Host—*Dicymolomia julianalis* Walsh, in cat-tail rush, Rockville, Pa., VI-6 to 19.

Tromatobia rufopectus Cress. (Det. Cush.). "Harrisburg, Pa., collected egg mass of garden spider from shrub. On opening egg cocoon found that eggs had been parasitized by an Ichneumonid, and the case contained a dozen or more whitish cocoons matted together. Upon opening one of these cocoons found the parasite in mature larval stage. Material caged. March 22 the parasites had emerged. There were twelve females and one male,—J. R. Stear."

Scambus indigator Walsh (Det. Vier.), Willow Street, Pa. Reared from pupa of *Mineola indiginella* Zell.

Perithous pleuralis Cress. (Det. Cush.), Hummelstown, Pa. Cocoons found in old (borer?) burrows in *Platanus occidentalis*, II-17—Knull.

Ephialtes aequalis (Prov.) (Det.Cush), Ledy, Pa., from Codling moth puparia.

Ichneumon irritator Fab., New Cumberland, Pa. Host—*Cyllene pictus*. Hummelstown, Pa., parasite of *Chrybothris* sp. larvæ found in sapwood of dead *Cercis canadensis*,—Kirk and Knull.

Ichneumon comstocki Cress. (Det. Vier.), Rockville, Pa. Reared from *Evetria comstockiana*,—V. A. E. Dæcke.

Rhyssa lineolata Kirby (Det. Cush.), Mt. Holly, Pa., June 14. Adult female ovipositing in dead hemlock infested by *Urocerus albicornis*.

Urocerus albicornis Fab., New Bloomfield, Pa. This horntail infested hemlock stumps, trees cut one year ago. At this time (Aug. 1) adult females are flying. Cutting into infested stumps we found pupæ of males and females, also mature larvæ, small larvæ and apparently newly hatched larvæ, as well as parasites.

Among the parasites, *R. lineolata* was common. Adults were collected from July 10 to 30 at various localities. On Aug. 1, at New Bloomfield, pupæ and newly transformed adults were chopped from the *Urocerus* cells. Observation by Knull and Champlain.

Rhysella humida Say (Det. Cush.), Rockville, Pa. A parasite of *Xiphidria champlaini* Roh. in dead *Carpinus caroliniana*.

Megarhyssa nortoni (Cress.), New Bloomfield, Pa., July 21 and August 1. Adults ovipositing in stumps infested by *Urocerus albicornis*,—Knull and Champlain.

Arotes formosus (Cress.) (Det. Cush.), Dauphin, Pa., Clarks Valley, VI-5. Parasite of *Bellamira scalaris* in dead river birch (*Betula nigra*),—Kirk and Champlain.

Gelis bruesi (Strickl.) (Det. Cush.), Rockville, Pa. Parasite on the eggs of Drassid spider. The spider egg cases were collected from the under side of stones. The cocoon of the parasite was in the space originally occupied by the spider egg mass.

Gelis obscurus (Cress.) (Det. Cush.), Rockville, Pa. Parasite on the eggs of Drassid spider. Both winged and wingless forms were reared.

Acroricnus junceus Cress. (Det. Vier.), Conewago, Pa., V-7. Reared from nest of solitary wasp on *Juniperus.* Also reared from nest of *Odynerus tigris,*—V. A. E. Daecke.

Itamoplex vinctus (Say). (Det. Cush.), Chambersburg, Pa., Reared from cocoons of peach tree borer (*Synanthedon exitosa*),—E. M. Craighead.

Agrothereutes nuncius Say (Det. Vier.), Harrisburg, Pa. Very common parasites in the cocoons of *Callosamia promethea.*

Lagarotis diprioni Roh. (Det. Cush.), Wyomissing, Pa. Reared from the cocoons of *Diprion lecontei.*

Chromocryptus nebraskensis Ashm. (Det. Cush.), Obelisk, Pa., XI-18. Reared IV-21, from the cocoon of *Tolype velleda.*

Amblyteles. Many species of this genus overwinter in the adult stage in cracks in bark, in old borer cells in logs and beneath stones. During the winter months they may be found packed closely together in cells in logs, six to a dozen specimens, sometimes one species, often a number of species together. Many of the records show that they are primary parasites of Lepidoptera, and usually emerge after the host has entered the pupal stage.

Amblyteles malacus Say (Det. Cush.), Harrisburg, Pa. Emerged IV-18 from Arctiid pupa from beneath bark in old willow log. Linglestown, Rockville, Harrisburg, Pa. Reared from Arctiid pupæ,—Kirk and Champlain.

Amblyteles cincticornis (Cress.) (Det. Vier.), Enid, Pa. Reared from moth pupa on cabbage. Adults collected in hibernation.

Amblyteles subcyaneus Cress. (Det. Vier.), Harrisburg, Pa. Reared from *Arctiid* pupæ from under bark of willow log,—A. F. Satterthwait & W. S. Fisher.

Amblyteles extrematatis (Cress.) (Det. Vier.). (Det. Cush.), Penbrook, Pa. Reared from pupa of Arctiid (*Gaberasa ambigualis*), D. K. McMillan. Also reared from Arctiid pupæ from other localities in Pennsylvania.

Amblyteles unifasciatorius (Say) (Det. Cush.), Harrisburg, Pa. Reared from Lepidopterous pupa.

Amblyteles paratus Say (Det. Cush.), Linglestown, Pa. Reared from small moth pupa,—Kirk and Champlain.

Amblyteles rufiventris Brullé (Det. Cush). From pupa of *Vanessa huntera*,—D. K. McMillan & W. S. Fisher.

(Det. Vier.). Emerged from pupa of *Vanessa cardui*,—P. R. Myers.

Amblyteles duplicatus Say (Det. Cush.), Enola, Pa. Reared from pupæ of *Eudamus tityrus*,—Kirk and Champlain.

Amblyteles cæruleus Cress. (Det. Cush.), Harrisburg, Pa. Reared from moth pupa,—Kirk and Knull.

Amblyteles sp. near *signatipes* (Cress.) (Det. Cush.). Reared from moth pupa collected beneath bark, Harrisburg, Pa., II-24,—P. R. Myers.

Vanhorniidæ

Vanhornia eucnemidarum Cwfd. Parasite of *Tharops ruficornis* in dead maple, Hummelstown, Pa.,—Knull and Champlain.

Ibaliidæ

Ibalia ensiger Norton, (Verified Roh.) New Bloomfield, Pa., —VIII. Ovipositing in hemlock, August 1, pupæ and adults from cells of *Urocerus albicornis* in stumps of hemlock,—Knull and Champlain.

Ibalia maculipennis Haldeman. (Det. Champlain). Very common in the vicinity of Harrisburg where it is a parasite of *Tremex columba* in hickory.

ON THE HYMENOPTEROUS GENUS HARPAGOCRYPTUS AND ITS ALLIES.[1]

By Charles T. Brues.

In the October issue of the Proceedings of the Hawaiian Entomological Society for 1908 Bridwell ('08) described a peculiar genus of Hymenoptera from Queensland, which he named Harpagocryptus and placed in the Family Dryinidæ. Harpagocryptus differs from all other genera of Dryinidæ except *Dryinopsis* Brues ('10)[2] in having the antennæ of the female 12-jointed, but Bridwell was influenced in placing the genus in this family by the habits of the larva which forms a sac on the side of the abdomen of crickets after the fashion of certain well known Dryinids.

About a year later ('10) the present writer described the genus Algoa, based on an anomalous insect from Cape Colony which he was unable to place with certainty in any family. At the time I did not compare it with Bridwell's description of Harpagocryptus, as I did not think the South African insect could be a member of the Dryinidæ. The two are, however, closely related, and I regarded them as synomous until recently, when Mr. Nathan Banks of the Museum of Comparative Zoölogy, gave me a specimen of a subapterous Hymenopteron from Long Island, New York, belonging to the same group. After a careful comparison of the two species before me with Bridwell's description, I have come to the conclusion that three closely related genera are concerned. I find also that I have a male of *Algoa heterodoxa* which is entirely wingless and distinguishable from the female only by the presence of two spines at the apex of the abdomen, and of thirteen antennal joints, while the femora are much more slender than those of the female.

[1]Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 205.

[2]This genus is similar in many respects to Methoca and apparently still more like Andreus Ashm. (03b), although I know the latter only from the description. Unfortunately the male is unknown and may or may not prove to be of the Thynnid type. Inasmuch as the systematic position of Methoca itself must still be considered as somewhat doubtful, I am unable to form a satisfactory opinion concerning the affinities of Dryinopsis.

Still a fourth member of this group is Olixon Cameron ('87) described from Panama and later redescribed by Kieffer ('11) from Mexico, as Saphobethylus. Turner and Waterston ('17) have shown these two genera to be complete synonyms as the type species of both are identical. Cameron regarded Olixon as an anomalous Braconid, but thought that it showed resemblance to certain Bethylids, particularly on account of its greatly thickened fore legs. Kieffer placed Saphobethylus in the Bethylidæ without question, but Turner and Waterston have referred the insect to the Rhopalosomatidæ.

All four genera are closely related, but are, I think, undoubtedly separable on good characters. They may be distinguished by means of the following key, which is based solely on the females, except in the case of Olixon.

1. Second segment of abdomen much the longest.....2
   Second segment of abdomen only a little longer than third, head transverse, vestigial wings present, reaching to base of abdomen, but without nervure; tarsal claws with a small subapical tooth...**Olixon** Cameron.
2. Tegulæ well developed; anterior wings present, but reduced in size and reaching to the tip of the propodeum; antennæ much longer than the head and thorax together, slender.....3
   Tegulæ and wings absent; antennæ stout, barely as long as the head and thorax.....**Algoa** Brues
3. Mandible with a long apical tooth and with three minute subapical teeth on the inner edge; head seen from above transverse....**Harpagocryptus** Bridwell
   Mandible with a long apical tooth, the inner teeth large and well-developed; head seen from above as long as broad.....**Nealgoa** gen. nov.

Of the three genera, Algoa and Nealgoa are distinguished by a number of characters which are indicated in the generic diagnoses that follow; likewise Algoa and Harpagocryptus are separable by several clear-cut structural differences. Harpa-

gocryptus and Nealgoa are evidently more closely similar, although many characters which might be useful are not given by Bridwell, and were it not for the great geographical separation, I should hesitate to propose a new genus for the North American species.

The characters which appear useful in differentiating the four genera follow.

Olixon Cameron.

Biol. Centr.-Americana, Hymenoptera, vol. 1, p. 412 (1887)
Kieffer. Bull. Soc. Sci. Bruxelles, vol. 35, p. 216 (1911) (*Saphobethylus*)

♂. Head transverse, wider than the thorax. Antennæ a little shorter than the body; first joint of flagellum one-half longer than second, all flagellar joints long, at least four times as long as thick; antennæ inserted below the lower margin of the eyes; malar space with a black carina connecting the eye and mandible; cheeks half as long as the eye. Mandibles curved, pointed and without tooth. Eyes almost attaining the posterior margin of the head. Prothorax a little longer than wide, bulging laterally in front. Anterior wing reaching to the base of the abdomen, without venation or stigma. Propodeum as long as the prothorax, its hind angles acutely toothed. Tarsal claws with a small tooth near tip. Third segment of abdomen a little shorter than the first. External genitalia consisting of a median stylet between a pair of parallel, upturned, filiform projections.

Harpagocryptus Bridwell.

Proc. Hawaiian Entom. Soc., vol. 2, pp. 34 (1908).

♀. Head transverse, wider than the thorax, occiput arcuately emarginate. Antennæ elongate, slender, much longer than the head and thorax together; second and following joints of antennæ subequally elongate, many times as long as thick; first joint shorter than second; pedicel very short, but evidently longer than wide. Mandibles with a long apical tooth and three

minute subapical teeth on the edge. Prothorax large and long, narrowed posteriorly; tegulæ present; fore wings strap-like, reaching to the posterior face of the propodeum; propodeum very long, its superior angles produced into a strong acute tooth on each side.

Algoa Brues.

Journ. New York Entom. Soc., vol. 18, p. 18 (1910)

♀. Head quadrate, not broader than long, occiput faintly emarginate. Antennæ short, barely as long as the head and thorax together; first flagellar joint longer than the second; second and following barely three times as long as thick; pedicel twice as long as thick and more than half as long as the first flagellar joint; antennæ inserted just above the level of the lower margin of the eyes. Malar space with a sharp furrow, shorter than the basal width of the mandible. Mandible with a long apical tooth and three minute subapical teeth on the edge. Eye separated by its own width from the hind margin of the head. Prothorax one-half longer than wide, obliquely narrowed posteriorly. Wings absent, tegulæ obsolete. Propodeum almost as long as the pronotum, much wider behind than in front, its hind angles slightly acute, but not toothed.

♂. Antennæ 13-jointed, longer and more slender than those of the female; pedicel nearly as long as the first flagellar joint; second and following flagellar joints subequal, each three times as long as thick. Ocelli obsolete as in the female. Front femora greatly thickened, the other legs slender, especially the hind ones; all tarsi long and slender, their joints all cylindrical, none flattened nor emarginate at tips. Abdomen armed with two slender, upturned spines at apex.

The male is so similar to the female, except for the additional antennal joint, more slender legs and small spines at the apex of the abdomen that I did not recognize its sex at the time the species was described. It measures 2.5 mm. in length, while the females I have seen range from 4 to 5.2 mm. The antennæ of the male are only slightly lighter basally while in the female the first three joints are honey-yellow.

Nealgoa gen. nov.

♀. Small, 5-6 mm. in length. Head, seen from above as long as broad, produced medially in front, truncate behind, the eyes approaching close to the occipital margin; malar space long, greatly exceeding the basal width of the mandible and equalling the length of the scape, malar furrow wanting; ocelli obsolete. Antennæ 12-jointed, long and slender, slightly attenuate at tips, much longer than the head and thorax together; scape two and one-half times as long as thick; pedicel half as long as the first flagellar joint; all flagellar joints long. Palpi as in Algoa and Harpagocryptus. Pronotum as long as broad, almost as wide as the head, strongly narrowed behind, from just before the middle; mesonotum short, twice as broad as long, tegulæ well developed. Fore wing paddle-shaped, reaching slightly beyond the tip of the propodeum, with a strong costal vein extending almost to the tip, and with two pale, oblique discal veins, evidently the vestiges of the radius and submedius; hind wing absent. Propodeum a little longer and narrower than pronotum, very slightly widened posteriorly, the superior angles prolonged into acute teeth; posterior face concave, almost vertical. First segment of abdomen more or less campanulate, separated from the second, both above and below, by a strong constriction; anterior face separated from the dorsal face by an arcuate carina which gives off a short median ridge behind; spiracle at the lateral margin just behind the carina. Second segment the longest and widest, three times as long as the first, longer than wide and broadest near the tip; apical margin emarginate medially; third to sixth segments subequal, narrowing to the acute tip of the abdomen, each one-third as long as the second, with straight posterior margins. Legs long, the anterior femora thickened, about one third as broad as long, middle and hind femora stout, but neither are noticeably thickened; fourth joint of all tarsi thickened and emarginate at tip, very deeply so on the front pair; claws acute, simple; tibial spurs 1, 2, 2; front and middle tarsi much longer than their tibiæ, posterior ones twice as long.

Type: *N. banksii* sp. nov.

Nealgoa differs from Algoa in its more slender middle legs, longer, unfurrowed malar space, eyes set close to the occipital margin, long slender antennæ, well developed tegulæ and short wings.

Nealgoa banksii sp. nov.

♀. Length 6 mm. Bright fulvo-ferruginous; antennæ infuscated beyond the third joint; middle femora and tibiæ weakly infuscated apically; hind femora strongly so; hind tibiæ fuscous, internally at base and apex pale golden, due to a coating of pale glistening pubescence; pulvilli black. Entire body without distinct sculpture although microscopically punctulate; surface subshining and clothed everywhere with dense, but extremely minute pale hair. Palp pale yellow, teeth of mandibles black. Wings brownish, costal vein dark brown, discal veins weak, pale brown, margin minutely fringed. Second and third joints of antennal flagellum the longest, subequal, each five times as long as thick; first joint distinctly shorter, twice as long as the pedicel; apical joints of flagellum gradually shorter and more slender, none less than five times as long as thick. Tarsi densely pubescent beneath, each joint with a distinct spine at each outer angle; longer spur of hind tibia half as long as the metatarsus.

Type in the Museum of Comparative Zoölogy, from Sea Cliff, Long Island, New York (Collection N. Banks).

As has been stated above, the four genera referred to are very closely related, but they form an extremely aberrant group and are not readily placed in any family. In 1910, I located Algoa in the Emboleminæ, which is generally considered as a part of the Bethylidæ, and pointed out that it was in many respects similar to the genera with multiarticulate antennæ which form the subfamily Sclerogibbinæ. These resemblances are mainly in the form of the head, pro- and mesothorax, thickened fore legs and abdomen. Pedinomma, also placed in the Emboleminæ by Ashmead and others (*v.* Brues '22) shows many resemblances and is likewise widely distributed, although differing in the number of antennal joints. Recently Turner and Waterston ('17) have referred Olixon to the Rhopalosomatidæ

on the basis of the similarity of the genitalia of the male and the number of antennal joints in the two sexes which is the same as that prevailing in Rhopalosoma and most aculeate Hymenoptera. There is also a curious similarity in the habits of Rhopalosoma and Harpagocryptus. Hood ('13) has shown that the larva of the former lives as an external parasite on the jumping tree cricket, Orocharis, while Bridwell's Harpagocryptus was reared from an Australian cricket of the family Trigonidiidæ on which the larva forms a sac like that of certain Dryinidæ.[1] This habit would, however, not give any reason to associate Harpagocryptus with Rhopalosoma rather than with the Drynidæ.

I am unable to reconcile the differences between Rhopalosoma and the genera here discussed sufficiently to assign them to the same family. The head in both sexes of Rhopalosoma is thin and strongly transverse, the eyes and ocelli very large and the front is not produced anteriorly. The thorax has the pronotum very short and collar-like and absolutely different from that of Algoa, *et al.* The propodeum is elongate-oval, not truncate nor sharply declivous behind; the abdomen has an extremely long petiole; the femora are only slightly thickened and the middle coxæ are approximate (widely separated by the mesosternum in Algoa). Such divergence, particularly in the form of the prothorax, head and propodeum is certainly of great importance, although the reduction of the eyes, mesothorax and scutellum is usually encountered in wingless or subapterous Hymenoptera.

Ampulicimorpha Ashmead, referred by him to the Embolemin æ does not show any great similarity to Algoa except in the general form of the head and thorax and the external male genitalia which resemble those of Olixon as described by Kieffer. On the other hand, the peculiar genus Sierolomorpha (placed by Ashmead ('03) in the family Cosilidæ), resembles Algoa quite closely in abdominal structure, in the general form of the thorax and head, thickened legs and antennæ (♂ 13-jointed, ♀ 12 jointed)[1].

[1]This insect is evidently the undescribed Embolemid mentioned by Perkins '05 (footnote, p. 27) as having been reared from "small cricketes of the genus Trogonidium or allied forms."

[1]Ashmead knew only the male, but several years later (Brues '05) the present writer found the female of this interesting insect).

The male of Algoa differs strikingly from all of the foregoing by the bispinose armature at the apex of the abdomen, which recalls that of the otherwise very different Mutillidæ. The male of Sierolomorpha has no spines that project beyond the tip of the abdomen. In Algoa I cannot find the "stylet" described by Kieffer for Olixon, which is evidently retracted in my specimen of Algoa, although the male of Ampulicimorpha bears a pair of spatulate claspers that project beyond the tip of the abdomen on each side of a median stylet.

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'03[b] *Ibidem*, Paper, No. 14, *t. c.* pp. 115-158.

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A BIBLIOGRAPHICAL NOTICE ON THE REDUVIID GENUS TRIATOMA (HEMIP.) [1]

By Roland F. Hussey.

The genus *Triatoma* has received much attention during recent years, both from the entomological and from the medical viewpoints. Chagas' discovery that these insects may serve as intermediate hosts in the transmission of trypanosomal diseases of the American tropics awakened an active interest in this genus among Brazilian and Argentine workers, and as a result numerous papers have been published on the biology and taxonomy of the group. Among these are two very important contributions—summaries, in fact, of our knowledge of the genus *Triatoma* —which may be called to the attention of entomologists in general.

The first of these is the "Revisão do genero Triatoma Lap.," by Dr. Arthur Neiva, of Rio de Janeiro. During the years 1910 to 1914, Dr. Neiva published a series of thirteen papers on this genus, some dealing with the biology of the Brazilian species, some with the medical aspects of their ecology, and some with their taxonomy. After studying the collections of the principal museums in Europe and in North and South America, he des-

[1] Contributions from the Entomological Laboratories of the Bussey Institution, Harvard University, No. 204.

cribed as new some thirteen species, six of which are from North American localities, one from Mexico, one from Cuba, three from South America, and two from tropical Africa. The descriptions, with few exceptions, appeared first in "O Brazil-Medico," a periodical published in Rio de Janeiro, and inaccessible to the great majority of entomologists in this country; but they are transcribed in full in Neiva's "Revisão." A copy of this work has recently come into my hands, and I shall review it here.

After a brief discussion of the general habits of the Reduviidæ, and of the hæmatophagous forms in particular, Dr. Neiva takes up the affinities of the genus *Triatoma*. He finds that the species of this genus, as it was formerly understood, intergrade with those of the genus *Lamus* Stal, and therefore places the latter as a synonym of *Triatoma*. He also found, on examining Stal's type of *Belminus rugulosus*, that it has ocelli, so he likewise reduces *Belminus* to a synonym, saying that this genus was founded on the lack of ocelli: but he makes no mention of the other (and equally important) characters on which Stal based the genus, and I feel that, despite Neiva's opinion, *Belminus* and *Triatoma* must be kept distinct for the present. *Panstrongylus guentheri* Berg is, according to Neiva, very closely allied to the African species of Triatoma that he had described a few years before; and therefore *Panstrongylus* too is dropped from the list of valid genera. Neiva's remarks on the genus *Eratyrus* Stal are very indefinite, and lead me to believe that he was doubtful as to its status.

Some twelve pages are then devoted to the biology of the forms which have been studied. Neiva concludes that the species of *Triatoma* are strictly hæmatophagous, and take their food either directly from some warm-blooded host or from other ectoparasites, such as the bedbug or other Reduviidæ, which have fed recently. Oviposition begins within thirty days after mating; a single female lays from 160 to 220 eggs, which are deposited in small masses containing from 1 to 45 ova. The eggs hatch in from 8 to 16 days, and the nymphs begin to feed three or four days later. The length of the life-cycle varies in the different

forms: in *T. rubrofasciata* it covers 210 days, in *T. megista* 260 days, and in *T. infestans* and *T. sordida* the period is intermediate between these two extremes. Thus there is probably but one brood each year.

Many species have become "domesticated," and some are strictly confined to houses and to outbuildings about farms: such species are *T. megista, T. sordida, T. sanguisuga, T. infestans, T. rubrofasciata, T. maculata,* and *T. rubrovaria.* Neiva believes that this adaptation is of comparatively recent date, and has been acquired since the discovery of America, since, he says, even to-day the Indian villages are not infested with these insects. The primitive habitats of the species of *Triatoma* are probably nests of various mammals: thus *T. geniculata* occurs in nests of the armadillo *Dasypus novemcinctus* L., while the North American *T. neotomæ* has been taken only in nests of the wood-rat *Neotoma,* and the South American *T. brasiliensis,* though now domesticated, is frequently found in nests of the rodent *Cerodon rupestris* Wied. The domesticated species have received many vernacular names, of which Neiva lists some twenty-five.

The genus is then considered from the taxonomic aspect. Laporte's original description is quoted in full. Then follow twelve pages devoted to the type species, *Triatoma rubrofasciata* (DeGeer), with quotations from Wolff, Latreille, Burmeister, Amyot et Serville, Blanchard, Herrich-Schäffer, Stal, and Walker, and with a very brief and unsatisfactory redescription of DeGeer's type, which is to be found in the Stockholm Museum. Neiva believes that this species is a native of India, and that it was introduced into America and elsewhere through the medium of commerce. This opinion, which is diametrically opposed to that of Kirkaldy[1], is based on the wide-spread distribution of this form in the Old World and on the fact that in America it is confined strictly to the coastal region.

An annotated list of thirty-six species then follows. *Panstrongylus guentheri,* though previously mentioned as being a

[1]Can. Ent., xxxix, 1907, p. 247; Faun. Hawaii, ii, 1910, p. 550.

Triatoma, is omitted here. The original descriptions of Neiva's own species are transcribed in full, and bibliographic references to the others are given. These descriptions, which deal almost entirely with color characters and mention scarcely any structural details, are utterly worthless for the satisfactory identification of the species, and it will be necessary to examine the types in order definitely to fix the forms. This work is soon to be undertaken by Mr. H. G. Barber and myself, and will be reported later.

A bibliography containing 97 titles is appended to the "Revisão."

The other paper, which Mr. Barber has very kindly brought to my attention is the "Contribución al estudio del gen. Triatoma Lap." by Eduardo del Ponte, published in Vol. II of the "Revista del Instituto Bacteriológico del Departamento Nacional de Higiene, Buenos Aires," and dated March 1921. The first part of this work, dealing with the anatomy of the Triatomas, is original; the chapters dealing with the biology and the systematics of the group are frankly based on Neiva's "Revisão," yet contain much additional material. Of particular interest is the account of the so-called *xenodiagnosis* (Brumpt), which affords an infallible method of diagnosing the early stages of suspected trypanosomal diseases, when the trypanosomes are too few to be detected readily by ordinary methods. Xenodiagnosis consists essentially in allowing an uninfected *Triatoma* nymph to bite the patient and to take up a considerable quantity of blood, after which the insect is placed in an incubator at 30° C. If trypanosomes were present in the patient, and were ingested by the Triatoma, they multiply rapidly in the insect and may readily be found.

In his systematic treatment of the genus, Del Ponte has made a very creditable effort to supply the deficiencies in Neiva's "Revisão." He gives good figures and full descriptions of the half-dozen species known to him (*T. circummaculata*, *T. infestans*, *T. platensis*, *T. rubrovaria*, *T. sordida*, and *T. vitticeps*; and description only of *T. megista*). In addition, he gives a full translation of the best description available (usually that of

Stal) for each of the species, with very few exceptions. Unfortunately his translations are often marred by minor inaccuracies. He has also drawn up a tentative synopsis of 35 species, calling it an "Ensayo de una clave teórica para el gen. Triatoma Lap." (p. 161), and states frankly that it is based very largely on descriptions and hence must be revised by comparison of actual specimens of the various forms. By some oversight, *T. venosa* (Stal) was omitted from his treatment of genus.

The species of *Triatoma*, as given by Neiva and Del Ponte, are listed below. The synonymies and distributions are taken directly from Neiva's "Revisão," and any additions or comments that I have made are enclosed in square brackets.

Genus TRIATOMA Laporte.

1832, Essai Class. Syst. Hémip., p. 11.

Orthotype *Reduvius gigas* Fabr.=*Cimex rubrofasciatus* DeGeer.

Conorhinus Laporte, 1832, op. cit., p. 77.
[?]*Belminus* Stal, 1859, Berlin. Ent. Zeitschr., iii, p. 102.
?*Eratyrus* Stal, 1859, op. cit., p. 103.
Lamus Stal, 1859, op. cit., p. 115.
Panstrongylus Berg, 1879, Hem. Argent., p. 167.
[?*Marlianus* Distant, 1902, Ann. Mag. Nat. Hist. (7), x, p. 191 (haplotype *Conorhinus diminutus* Walk.=*Belminus rugulosus* Stal).]

1. **africana** (Triatoma) Neiva, 1911, Proc. Ent. Soc. Wash., xiii, p. 239, and 1914, Revis. Triatoma, p. 32; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 168.

   Locality: Tropical Africa. Type in Kgl. Zool. Museum, Berlin.

2. **arenaria** (Conorhinus) Walker, 1873, Cat. Heter., viii, p. 18; Neiva, 1914, Revis. Triatoma, p. 33; Del Ponte, 1921, op. cit., p. 169.

   Locality: Brazil (Pará). A doubtful species: not recognized.

3. **brasiliensis** (Triatoma) Neiva, 1911, Brazil-Medico, xxv, p. 461, and 1914, Revis. Triatoma, p. 33; Del Ponte, 1921, op. cit., p. 169.

   Locality: Brazil (Rio Grande do Norte: Caicó). Habitat, in nests of the Mocó (*Cerodon rupestris* Wied; Rodentia). Type in Instituto Oswaldo Cruz.

4. **chagasi** (Triatoma) Brumpt & Gomez, 1914, Ann. Paul. Med. Cirurg., iii, No. 4, p. 75; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 169.

   Locality: Brazil (Minas Geraes: Serra de Cabral, near Lassance). Habitat, in nests of *Cerodon rupestris* Wied.

5. **circummaculata** (Conorhinus) Stal, 1859, Berl. Ent. Ztschr., iii, p. 114; Neiva, 1914, Revis. Triatoma, p. 35; Del Ponte, 1921, op. cit., pp. 163, 170, fig.

   Localities: Uruguay; Argentina.

6. **dimidiata** (Reduvius) Latreille, 1811, in Rec. d'Observ. Zool., Voy. Humboldt et Bonpland, p. 223, pl. xv, fig. 11; Neiva, 1914, Revis. Triatoma, p. 36; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 171.

6a. **dimidiata maculipennis** (Conorhinus) Stal, 1859, Berl. Ent. Ztschr., iii, p. 111; Champion, 1899, Biol. Centr.-Amer., Rhynch.-Het., ii, p. 207, pl. xii, fig. 21 (Conorhinus); Neiva, 1914, Revis. Triatoma, p. 36; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 172.

   Localities: Mexico; Honduras; Costa Rica; Guatemala; Nicaragua; Panama; Venezuela; Ecuador; Peru.

7. **flavida** (Triatoma) Neiva, 1911, Brazil-Medico, xxv, No. 44, p. , and 1914, Revis. Triatoma, p. 38; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 172.

   Locality: Cuba. Type in U. S. National Museum.

8. **geniculata** (Reduvius) Latreille, 1811, in Rec. d'Obs. Zool., Voy. Humb. et Bonpl., i, p. 225 [Neiva says p. 151], pl. xv, fig. 12; Stal, 1859, Berl. Ent. Ztschr., iii, p. 116 (Lamus); Neiva, 1914, Revis. Triatoma, p. 39; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 173.

   lutulentus (Conorhinus) Erichson, 1848, in Schomberg, Versuch Faun. Flor. Brit. Guiana, iii, p. 614.

   corticalis (Conorhinus) Walker, 1873, Cat. Heter., viii, p. 17.

   Localities: Peru; Venezuela; French Guiana; Brazil; Paraguay. Primitive habitat, nests of *Dasypus novemcinctus* L. (Edentata).

9. **gerstaeckeri** (Conorhinus) Stal, 1859, Berl. Ent. Ztschr., iii, p. 111; Neiva, 1914, Revis. Triatoma, p. 40; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 174.

   Localities: Southern United States; Mexico.

10. **guentheri** (Panstrongylus) Berg, 1879, Hem. Argent., p. 168; Neiva, 1914, Revis. Triatoma, p. 6, in text [not treated in list of species].

    Locality: Argentina.

11. **heidemanni** (Triatoma) Neiva, 1911, Brazil-Medico, xxv, No. 44, p. , and 1914, Revis. Triatoma, p. 41; Del Ponte, 1921, Rev. Inst. Bact. B. A., ii, No. 6, p. 175.

    Localities: Pennsylvania; Tennessee; Illinois; Texas. Type in U. S. National Museum.

12. **howardi** (Triatoma) Neiva, 1911, Proc. Ent. Soc. Wash., xiii, p. 240, and 1914, Revis. Triatoma, p. 43; Del Ponte, 1921, op. cit., p. 175.

    Locality: Tropical Africa. Type in Kgl. Zool. Museum, Berlin.

13. **indictiva** (Triatoma) Neiva, 1912, Brazil-Medico, xxvi, No. 3, p. , and 1914, Revis. Triatoma, p. 44; Del Ponte, 1921, op. cit., p. 175.

Localities: Arizona (Kerville); Texas. Type in U. S. National Museum.

14. **infestans** (Reduvius) Klug, 1834, in Meyen's Reise um die Erde, i, p. 412; Neiva, 1914, Revis. Triatoma, p. 45; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, pp. 164, 176, fig.

renggeri (Conorhinus) Herrich-Schäffer, 1848, Wanz. Ins., viii, p. 71, fig. 838.

sextuberculatus (Conorhinus) Spinola, 1852, in Gay's Hist. Chile, vii, p. 218.

octotuberculatus (Conorhinus) Philippi, 1860, Reis. Atacama, p. 173 (nymph).

paulseni (Conorhinus) Philippi, 1860, op. cit., p. 174. (Nymph.)

gracilipes (Conorhinus) Philippi, 1860, op. cit. p. 174. (Nymph.)

gigas (Conorhinus) Burmeister, 1861 (nec Fabricius), Reise La Plata Staat., i, p. 167.

Localities: Brazil; Bolivia; Paraguay; Uruguay; Argentina; Chile.

15. **lignaria** (Conorhinus) Walker, 1873, Cat. Heter., viii, p. 17; Lethierry et Severin, 1896, Cat. Gén. Hém., iii, p. 117 (Eratyrus); Distant, 1902, Ann. Mag. Nat. Hist. (7), x, p. 192 (Lamus); Neiva 1914, Revis. Triatoma, p. 46; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 177.

Locality: Guiana. [Locality omitted by Neiva, 1914, op. cit.]

16. **maculata** (Conorhinus) Erichson, 1848, in Schomberg, Versuch. Faun. Flor. Brit. Guiana, iii, p. 614; Stal, 1859, Berl. Ent. Ztschr., iii, p. 108 (Conorhinus; as new); Neiva, 1914, Revis. Triatoma, p. 47; Del Ponte, 1921, op. cit., p. 177.

?*nigromaculata* (Conorhinus) Stal, 1872, Enum. Hem., ii, p. 111.

Localities: Venezuela; British Guiana; Brazil.

17. **maxima** (Conorhinus) Uhler, 1894, Proc. Calif. Acad. Sci. (2), iv, p. 286; Neiva, 1914, Revis. Triatoma, p. 48; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 178.

Localities: California; Lower California.

18. **megista** (Conorhinus) Burmeister, 1835, Handb. d. Ent., ii, pt. 1, p. 246; Stal, 1859, Berl. Ent. Ztschr., iii, p. 115 (Lamus); Neiva, 1914, Revis. Triatoma, p. 48; Del Ponte, 1921, op. cit., pp. 165, 179.

porrigens (Conorhinus) Walker, 1873, Cat. Heter., viii, p. 19.

Localities: British Guiana; Brazil.

19. **mexicana** (Triatoma) Neiva, 1912, Brazil-Medico, xxvi, No. 3, p. , and 1914, Revis. Triatoma, p. 50; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 180. [Not *Conorhinus mexicanus* Herrich-Schäffer, 1848, Wanz. Ins., viii, p. 71, figs. 839, 840,=*Meccus mexicanus* (H. S.) Stal, 1859, Berl. Ent. Ztschr., iii, p. 105.]

rubrofasciata (Conorhinus) Champion, 1899 (nec DeGeer), Biol. Centr.-Amer. Rhynch.-Het., ii, p. 208, pl. xii, fig. 22.

Locality: Mexico.

20. **migrans** (Triatoma) Breddin, 1903, Sitz.-Ber. Ges. Naturf. Freunde Berlin, p. 11; Neiva, 1914, Revis. Triatoma, p. 52; Del Ponte, 1921, op. cit., p. 181.

?*phyllosoma* (Conorhinus) Herrich-Schäffer, 1848, Wanz. Ins., viii, p. 70, fig. 837. (Name preoccupied: Burmeister, 1835.)

Locality: Java.

21. **neotomae** (Triatoma) Neiva, 1911, Brazil-Medico, xxv, p. , and 1914, Revis. Triatoma, p. 53; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 181; Schwarz, 1901, Proc. Ent. Soc. Wash., iv, p. 398 (without name).

Localities: Texas; Arizona. Habitat, in nests of *Neotoma albigula* Hardl. and *N. micropus* Baird (Rodentia). Type in U. S. National Museum. [Neiva also gives New Mexico and California; but the data for this species and for *T. uhleri* appear to have been confused.]

22. **nigromaculata** (Conorhinus) Stal, 1872, Enum. Hem., ii, p. 111; Neiva, 1914, Revis. Triatoma, p. 55; Del Ponte, 1921, op. cit., p. 182.

variegata (Conorhinus) Stal, 1859 (nec Drury), Berl. Ent. Ztschr., iii, p. 113; Walker, 1873, Cat. Heter., viii, p. 18

?=*maculata* Erichson 1848.

Locality: Venezuela. Type specimen not found.

23. **occulta** (Triatoma) Neiva, 1911, Brazil-Medico, xxv, p. , and 1914, Revis. Triatoma, p. 56; Del Ponte, 1921, op. cit., p. 182.

discipennis (Conorhinus) Stal, MS. (Berlin Museum.)

Locality: Texas. Type in Kgl. Zool. Museum, Berlin.

24. **ocellata** (Triatoma) Neiva, 1914, Revis. Triatoma, p. 55; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 182.

Locality: Arizona (Mohave). Type in U. S. National Museum.

25. **platensis** (Triatoma) Neiva, 1913, Anal. Mus. Nac. Buenos Aires, xxiv, p. 197, and 1914, Revis. Triatoma, p. 57; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, pp. 165, 183, fig.

Locality: Argentina (Pampa central). Type in Museo Nacional de Buenos Aires.

26. **protracta** (Conorhinus) Uhler, 1894, Proc. Calif. Acad. Sci. (2), iv, p. 284; Neiva, 1914, Revis. Triatoma, p. 58; Del Ponte, 1921, op. cit., p. 183.

Localities: Utah; California; Lower California.

27. **recurva** (Conorhinus) Stal, 1868, Hem. Fabr., i, p. 124; Neiva, 1914, Revis. Triatoma, p. 59; Del Ponte, 1921, op. cit., p. 184.

Locality: Brazil.

28. **rubida** (Conorhinus) Uhler, 1894, Proc. Calif. Acad. Sci. (2), iv, p. 285; Neiva, 1914, Revis. Triatoma, p. 59; Del Ponte, 1921, op. cit., p. 184.

Locality: Lower California.

29. **rubrofasciata** (Cimex) DeGeer, 1773, Mém. Hist. Ins., iii, p. 349, pl. xxxv, fig. 12; Neiva, 1914, Revis. Triatoma, pp. 20-32; Del Ponte, 1921, op. cit., p. 162.

gigas (Reduvius) Fabricius, 1775, Syst. Ent., p. 729.

erythrozonias (Cimex) Gmelin, 1788, Syst. Nat. Edn. 13, i, pt. 4, p. 2181.

?*phyllosoma* (Conorhinus) Herrich-Schäffer, 1848, Wanz. Ins., viii, p. 70, fig. 837. (Name preoccupied, Burmeister, 1835.)

stalii (Conorhinus) Signoret, 1861, Ann. Soc. Ent. France (3), viii, p. 967.

rubrovarius (Conorhinus) Stal, 1868, *partim*, Hem. Fabr., i, p. 124.

[*rufofasciata* (Triatoma) Van Duzee, 1916, Check-List Hem. N. Amer., p. 29, No. 742; and 1917, Cat. Hem. N. Amer., p. 248. 742.]

Localities: China; Formosa; Philippines; Borneo; New Guinea; Tonga; Java; Sumatra; Singapore; Malay Peninsula; Indo-China; India; Andaman Islands; Ceylon; Seychelles; Mauritius; Madagascar; Zanzibar; Angola; Sierra Leone; Azores; Haiti; St. Thomas; French Guiana; Brazil; Argentina; Hawaii. [Not United States!]

30. **rubrovaria** (Conorhinus) Blanchard, 1843, in D'Orbigny, Voy. dans l'Amér. mérid., vi, pt. 2, p. 219, pl. xxix, fig. 7; Stal, 1868, Hem. Fabr., i, p. 124

(*partim*) (Conorhinus); Neiva, 1914, Revis. Triatoma, p. 60; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, pp. 166, 185, fig.

rubroniger (Conorhinus) Stal, 1872, Enum. Hem., ii, p. 112.

Localities: Brazil; Uruguay. (Not Java!)

31. **rufotuberculatus** (Lamus) Champion, 1899, Biol. Centr.-Amer., Rhynch.- Het., ii, p. 210, pl. xii, figs. 27, 27a; Neiva, 1914, Revis. Triatoma, p. 61; Del Ponte, 1921, op. cit., p. 186.

Locality: Panama.

32. **rugulosa** (Belminus) Stal, 1859, Berl. Ent. Ztschr., iii, p. 102; Neiva, 1913, Mem. Inst. Osw. Cruz, v, p. 74 (Triatoma), and 1914, Revis. Triatoma, p. 62; Del Ponte, 1921, op. cit., p. 187.

diminutus (Conorhinus) Walker, 1873, Cat. Heter., viii, p. 19; Distant, 1902, Ann. Mag. Nat. Hist. (7), x, p. 191 (Marlianus).

Localities: Costa Rica; Colombia; Venezuela.

33. **sanguisuga** (Conorhinus) Leconte, 1855, Proc. Acad. Nat. Sci. Phila., vii, p. 404; Neiva, 1914, Revis. Triatoma, p. 63; Del Ponte, 1921, op. cit. p. 188.

lateralis (Conorhinus) Stal, 1859, Berl. Ent. Ztschr., iii, p. 107.3.

lecticularius (Conorhinus) Stal, 1859, op. cit., 107.2.

lenticularius (Conorhinus) Stal, 1868, Hem. Fabr., i, p. 124.

variegatus (Conorhinus) Stal, 1872 (nec Drury), Enum. Hem., ii, p. 111; Uhler, 1876, Bull. U. S. Geol. Geogr. Surv., i, p. 331; and other North American authors.

ambigua (Triatoma) Neiva, 1911, Brazil-Medico, xxv, p. 422 (as variety of *sanguisuga*).

Localities: Maryland; Florida; Texas; Argentina (Misiones, in coll. Berg, Mus. La Plata).

34. **sordida** (Conorhinus) Stal, 1859, Berlin. Ent. Ztschr., iii, p. 108; Neiva, 1914, Revis. Triatoma, p. 66; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, pp. 167, 188, fig.

Localities: Brazil; Bolivia; Uruguay; Argentina.

35. **tennuis**[1] (Triatoma) Neiva, 1914, Mem. Inst. Osw. Cruz, vi, fasc. 1, p. 35; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, p. 189.

Locality: Brazil (Bahia).

36. **uhleri** (Triatoma) Neiva, 1911, Brazil-Medico, xxv, p. , and 1914, Revis. Triatoma, p. 66; Del Ponte, 1921, op. cit., p. 190.

Localities: Texas; New Mexico; Arizona; California. Type in U. S. National Museum.

37. **variegata** (Cimex) Drury, 1770, Illustr. Exot. Entom., i, p. 109, pl. xlv, fig. 5; Neiva, 1914, Revis. Triatoma, p. 68; Del Ponte, 1921, op. cit., p. 190.
?*claviger* (Cimex) Gmelin, 1788, Syst. Nat. Edn. 13, i, pt. 4, p. 2179.

Locality: Antigua. (An unrecognized species, possibly synonymous with *T. rubrofasciata.*)

38. **venosa** (Conorhinus) Stal, 1872, Enum. Hem., ii, p. 111; Neiva, 1914, Revis. Triatoma, p. 70. [Omitted by Del Ponte.]

Localities: Costa Rica; Panama; Colombia.

39. **vitticeps** (Conorhinus) Stal, 1859, Berl. Ent. Ztschr., iii, p. 109; Neiva, 1914, Revis. Triatoma, p. 71; Del Ponte, 1921, Rev. Inst. Bact. Bs. Aires, ii, No. 6, pp. 168, 191, fig.

Locality: Brazil (Rio de Janeiro).

[1]So written by Del Ponte. The Zoological Record for 1914 writes *T. tenuis.*

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Del Ponte, Eduardo. 1920-21. Contribución al estudio del gen. Triatoma Lap. Revista del Instituto Bacteriológico del Departamento Nacional de Higiene, Buenos Aires, ii, No. 5, pp. 729-744, 23 plates, and ii, No. 6, pp. 133-196, 39 plates.

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PROCEEDINGS OF THE CAMBRIDGE ENTOMOLOGICAL CLUB.

At the meeting of October 11, 1920, Prof. W. M. Wheeler read a paper by himself and Mr. L. H. Taylor on parasitism of *Vespa arctica* upon *Vespa diabolica* which was published in December 1921. A discussion followed on parasitism in general and especially the habits of *Stylops* in *Andrena, Halictus* and other Hymenoptera.

Dr. R. Heber Howe showed remains of beetles from peat deposits at Eastham, Cape Cod, Mass., between layers of glacial till and too far away from present outcrops to be of recent origin.

At the meeting November 8, Mr. L. B. Uichanco read a paper on the development of certain unicellular organisms which live symbiotically in the bodies of Aphids. These are found in the ovaries and enter the eggs at an early stage. Later

they increase in number in a mass of cells in the middle of the embryo which becomes divided in two and in the newly hatched Aphid forms a pair of conspicuous organs. The paper was illustrated by numerous drawings.

Mr. Roland Hussey showed specimens of *Scaptocoris castaneus* from Venezuela belonging to a tropical group of the Hemipterous family Cydnidæ in which the hind tibia is swollen and truncate and the tarsus absent while the front tibia is prolonged by the fusion of the apical spines much beyond the insertion of the tarsus and the latter is much reduced in size.

Mr. F. W. Dodge showed 125 species of the coleopterous family Meoidæ, part of the collection of the late Mr. Fuchs of California.

At the meeting of December 13, Prof. C. T. Brues showed several rare wingless Hymenoptera of unknown habits, one a species of Pedinomma Westw. and another of the genus Algoa.

J. H. Emerton exhibited his portable collection of two hundred species of native spiders illustrated by charts, drawings and photographs of cobwebs.

Mr. F. W. Dodge exhibited a collection of beetles of the family Coccinellidæ.

The annual meeting was held January 10, 1922. The Secretary's report shows than ten meetings were held during the past year with average attendance of nineteen persons. Four new members were elected and the present membership numbers sixty-nine. The following officers for 1922 were elected: President, Wm. M. Wheeler; Vice president, L. R. Reynolds; Secretary, J. H. Emerton; Treasurer, Fred H. Walker; Editor, C. T. Brues; Executive committee, Nathan Banks, S. W. Denton, L. W. Swett.

Mr. Nathan Banks in retiring from the presidency addressed the Club on the value of field observation and the importance of careful records and prompt publication. He thought much valuable work was lost through failure to appreciate its importance, and through timidity in failing to publish what had been discovered. Observers should not be tempted to wait too long for perfection, as completion of their investigations in such things

are of necessity imperfect and must be revised and republished as knowledge improves.

Mr. R. Heber Howe spoke of the genus Gompus in New England. There are 22 species but only two, *exilis* and *spicatus*, are common. Other species, usually rare, occur at some seasons in great abundance owing perhaps to the period of two or three years passed in development.

Mr. J. H. Emerton gave a short account of the meetings of the American Association for the Advancement of the Science at Toronto during Christmas week.

At the meeting of February 14 Mr. O. E. Plath continued his account of the habits of Bombus begun at the September meeting, by reading a paper on the genus Psithyrus and its habits in the Bombus nests which he had under observation the past summer.

The accepted design for a Club Seal was shown and now appears on the cover of Psyche.

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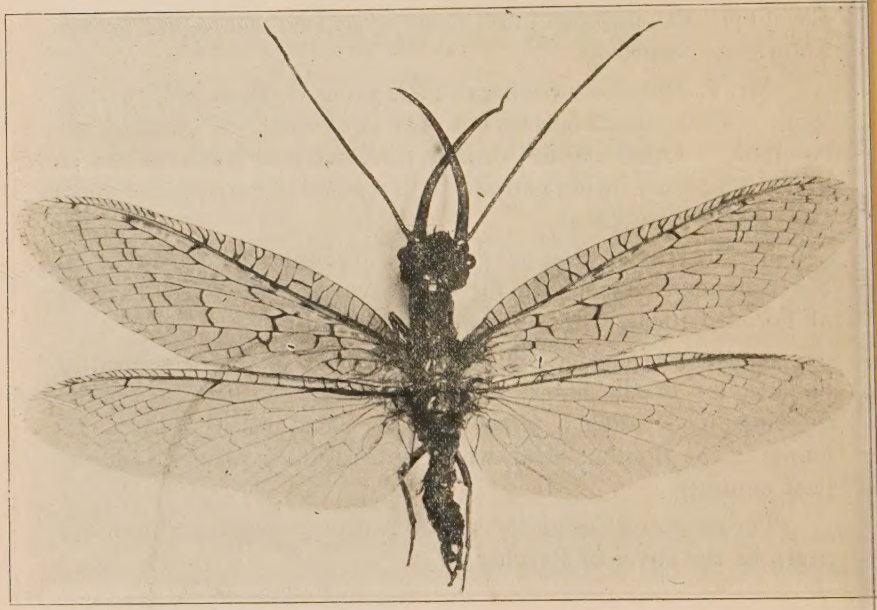

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